Met Office

NEWS

New studies highlight benefits of methane removal

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New research has found that removing methane from the atmosphere could reduce global surface temperatures by 0.21°C and deliver air quality improvements.

The collaborative research carried out by Stanford University in the US and the Met Office has been published as part of the Royal Society's special issue on Methane and Climate.

Methane is the second strongest greenhouse gas and is over 25 times more potent than Carbon Dioxide when it comes to trapping heat in the atmosphere. Studies show it has contributed 0.5°C to current global warming. The gas comes from a wide range of human activities including agriculture, waste and fossil fuel extraction and use. It also comes from natural sources such as wetlands and wildfires which may increase in the future along with new sources from thawing permafrost.

By using a new climate model jointly developed by UKRI-NERC Centres and the Met Office, the study reveals that removing around three years-worth of human-caused emissions of methane would reduce global surface temperatures by approximately 0.21°C.

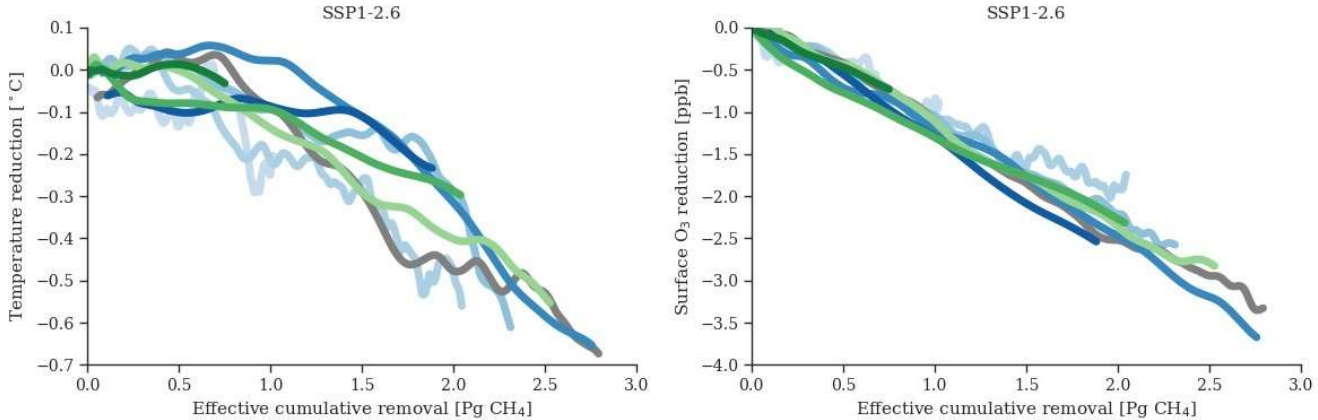
The new methane-emissions capability in the UKESM1 model used in this research takes into account methane sources, feedbacks and interactions between human activity, natural sources, atmospheric chemistry and future climate change. This provides the best understanding yet on the benefits of removing the potent greenhouse gas from the atmosphere.

"We're very excited to see these results from our new model", said Dr Chris Jones, Research Fellow at the Met Office Hadley Centre - "it represents the most complex and complete model of the climate and earth system to date and allows us to really explore new possible ways to address the challenges of climate change."

As well as reducing global surface temperatures, the research found that methane removal could lead to significant air quality improvements through reduced surface ozone concentrations. The new analysis found that around 50,000 premature deaths could be prevented each year if the same three years of human emitted methane were removed from the atmosphere. Ozone is an irritant to the airways and can exacerbate respiratory diseases, it can also cause damage to crops.

Sam Abernethy, Stanford Applied Physics PhD student and lead author of the new modelling study, explains: "This new model allows us to better understand how methane removal impacts warming on the global scale and also air quality on the human scale."

Co-author and Met Office atmospheric composition scientist Dr Fiona O'Connor said: "It's increasingly important to understand not just the climate consequences but also the co-benefits of mitigation. Here the improved air quality makes methane removal twice as beneficial for the planet."



Reducing human-caused methane emissions is likely to prove difficult because they are linked so closely to food production. In the absence of rapid global changes in emissions, many argue that active removal of greenhouse gases will be required. This new research provides important evidence of the benefits of methane removal from the atmosphere and argues the need for more research on these technologies in relation to methane.

You can read more about the new UKESM1 model and the important steps it makes in our Research News article. The full papers can be read online:

Methane removal and the proportional reductions in surface temperature and ozone

Atmospheric methane removal: a research agenda

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